

Unit 1B. 1 → States/Phases of Matter

1. Matter is anything that has mass and takes up space
2.
 - a. Solid
 - b. Liquid
 - c. Gas
 - d. Plasma
 - e. Bose-Einstein Condensate
- i) Each state of matter is designated by the energy, movement, and behavior of particles.
3. Each state of matter has a different:
 - a. Energy level of the particles
 - b. Amount of movement
 - c. Spacing of particles
 - d. Temperature
4. Energy of a particle determines the kinetic energy (and thus the temperature and state) of a substance.

Kinetic Theory of Matter:

1. AKA: Atomic Theory

- a. All matter is composed of small particles (atoms, molecules, ions)
- b. Particles are in constant, random motion (Brownian motion)
- c. Particles collide with each other and sides of their container

States/Phases of Matter:

1. Solids

- a. Energy \rightarrow Low
- b. Movement \rightarrow Vibrate against each other, don't move around much because they are "stuck" in place
- c. Particle spacing \rightarrow very little space between particles
- d. Volume shape \rightarrow definite volume, definite shape

2. Liquids

- a. Energy \rightarrow medium
- b. Movement \rightarrow flow around each other
- c. Particle spacing \rightarrow some space
- d. Volume shape \rightarrow definite volume, no definite shape

3. Gases

- a. Energy \rightarrow high
- b. Movement \rightarrow high; flying past each other; ⁱ⁾ enough energy to escape attractive forces between particles
- c. Particle spacing \rightarrow very far apart
- d. Volume shape \rightarrow No definite volume, No definite shape

4. Plasma is electrically charged gas
- a. Created at very high temperatures
(greater than $10,000^{\circ}\text{F}$)
 - i) Seen in sun, stars, and lightning
 - b. Most abundant state of matter in the universe
 - i) NOT the most abundant on earth

Changes in States/phases of Matter

1. Increase Energy:

- Temperature increases
- Atoms/molecules move more

2. Decrease Energy:

- Temperature decreases
- Atoms/molecules move less

